

IMPLEMENTATION OF PRIMARY SCHOOL SCIENCE AND MATHEMATICS

BASIC EDUCATION CURRICULA IN NORTH CENTRAL NIGERIA:

IMPLICATIONS ON NATIONAL DEVELOPMENT

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ABSTRACT

The research probes the Implementation of Primary School Science and Mathematics Curricula in North Central Nigeria and its implications on National Development. Five (5) research questions were answered. A survey design was adopted and one hundred and seventy-seven (177) respondents were sampled. Three validated questionnaires were used for data generation. The results revealed that the present state of Science and Mathematics learning environment in primary schools were wholesomely inadequate; there was inadequate financial support, haphazard inspection of schools and non-provision of structured opportunities by the government for Science and Mathematics teachers to develop on the job. Also, most school administrators were highly committed at ensuring proper implementation of Science and Mathematics curricula, nonetheless financial constraints probably hampered their efforts at ensuring composite furnished staff rooms that could boost teachers morale to implementing Science and Mathematics curricula curiously. It was recommended that: curriculum planners working for and with the government should expose science and mathematics teachers to uniform procedural rudiments of the curricula in a nationwide workshop and substantial and adequate infrastructure and facilities should be provided by the government to schools for the implementation of science and mathematics curricula and such should be utilized and managed with a positive mindset.

KEYWORDS: Curriculum, Education, Implementation, School & Teacher

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1. INTRODUCTION

It has been stated emphatically by the Federal Government of Nigeria (2014) in the National Policy on Education that education in Nigeria is an instrument par excellence for effecting national development. The positions and functions of primary education in Nigeria cannot be underestimated with regards to national development. This level of education is guided by the various subjects' curricula. The implementation of such curricula is hung on the teachers. This is why it was emphasized by the Nigerian Educational Research and Development Council (NERDC, 2007) that effective implementation of the new curriculum in Science subjects relies heavily on the availability of teachers who are well grounded in the subject matter and the philosophy and

purpose of the curricula.

This invariably presupposed to the better in meeting the aspirations of the Federal Government with respect to National Development, the disposition of the teacher's intellect is very crucial. For this to be actualized, there is a need to examine how much the teachers are putting in, on the correct interpretations of the curricula as well as the enabling environment required for implementation. It is no longer an embellishment that science and mathematics play paramount functions in the struggle for sustainable national development in any country globally.

Significantly, the contributions of primary education as a solid foundation and gradual structuring of the development cannot be handled with flippancy. It is an indisputable fact that the pupils enrolled in primary schools are extracting from the different local culture within Nigeria whose ways of life is usually at variance with those of scientists and mathematicians. The language of science is equally as strange from the hearing of the Nigerian child. It is the responsibility of the teachers to harmonize a bridge between the child's background and the school environment. The teachers can only affect this by being well grounded in the content of the curriculum. This was why this research examined the extent of implementation of the Nigerian education curriculum with a purposive focus on science and mathematics education in order to establish some concomitant implications.

Education curriculum reforms and implementation over the years generally have been a central issue in Nigeria's National Development. Despite the fact that sciences and mathematics are core subjects in a school curriculum, the implementation has not been effective and productive enough. Yet, for any nation to raise its shoulders among equals globally, the relevance and uniqueness of these two subjects cannot be underrated. There are limited researchers and insufficient works of literatures on the implementation of primary school science and mathematics, basic education curricula, inclusive of some schools in North Central Nigeria. The research therefore filled, up some gaps in the existing works of literatures on curriculum implementation in North Central Nigeria.

The Specific objectives of the study included to: Find out the extent to which science and mathematics curricula have been effectively implemented by teachers in primary level of the Nigerian education system; Find out the adequacy of the role of administrators in the implementation of primary school science and mathematics curricula; Determine the extent to which government enhances the effective implementation of primary school science and mathematics curricula.

1.1. Research Questions

The Study proffers answers to the following questions:

- What is the level of teachers' implementation, compliance with the primary school curriculum?
- What are the conditions of infrastructure and facilities in the primary schools?
- What assessment could be obtained in terms of how the present learning environment has paved way for science and mathematics advancement in Nigeria Primary schools?
- To what extent does government provide opportunities for capacity building to Science and Mathematics teachers?
- To what extent has administrators shown commitments to ensuring adequate implementation of science and mathematics curricula in primary schools?

2. METHOD

The study was evaluative and survey design adopted for the entire operation of data collection. The target population for the study was all stakeholders in primary schools in North Central Zone of Nigeria. The population was made up of the head teachers, the teachers of Science and Mathematics and the pupils of the schools. The sample randomly selected for the study from the population comprised three states from which two local government areas were selected at random each. Two primary schools were selected from each of the local government areas to sum up to 12 Primary Schools. Twentytwo(22) administrators/head teachers of the schools, 33 primary school science and mathematics teachers and 122 Primary school pupils were selected from the schools through random sampling to form the participants of the study.

There were three instruments collectively referred to as Researcher's Drafted Questionnaire namely: Primary School Teachers Questionnaire (PSTQ); Primary School Pupils Questionnaire (PSPQ); and School Administrators Questionnaire (SAQ). The questionnaires were sectioned for the respondent's demographic information and the reaction to likely factors responsible for the adequate or inadequate implementation of science and mathematics curricula. Suggestions were required on the way forward at actualizing the goal of implementing the curricula as indicated by NERDC. The instruments were validated for their face, construct by three Science and Mathematics educators in tertiary institutions in the North Central Zone. The comments of the experts added value to the refined copies of the instruments that were used for the pilot study.

A pilot study conducted on a small sample from among the population not included in the investigation proper provided the data analysis for the reliability of the instrument through Guttman-split half PSTQ to obtain 0.588 reliability index; Guttman split half for PSPQ to obtain 0.563 reliability index; Cronbach Alpha for SAQ to obtain 0.664 reliability index. These relatively high coefficient values adjudged the usability of the instrument. The statistical tool employed to analyze the relevant data gathered in the cause of this study was purely qualitatively descriptive. The computation of the means and standard deviation and percentage of the frequency of the variables provided the basis for answering the research questions in this study.

3. RESULTS

3.1. Research Question 1: What is the level of implementation, compliance of Science and Mathematics curricula by teachers in primary?

Table 1: Analysis of Level of Curricula Implementation Compliance by Teachers

Level	Variable	N	\bar{X}	SD
Primary	Sex: Male	15	21.47	4.155
	Female	16	22.81	3.060
	Qualification: NCE	20	23.00	3.479
	BSC	4	18.50	4.123
	ND	1	24.00	-
	HND	2	22.50	0.707
	BSCED	3	20.33	4.041
	School Type:			
	Public	19	23.16	2.911
	Private	12	20.58	4.209

As revealed in table 1, female primary school teachers had higher mean scores of 22.81 (SD = 3.060) on Science and Mathematics curriculum implementation while their male counterparts had 21.47 (SD = 4.155). This shows that female primary school teachers complied better in the implementation of Science and Mathematics curricula than their male counterparts. Similarly, Table 6 revealed that those primary school teachers with a National Diploma (ND) qualification had the highest mean score of 24.00 (SD = .000), then the NCE with 23.00 (SD = 3.479), followed by an HND with 22.50 (SD = .707), then those of BSc (Ed) with 20.33 (SD = 4.041) and the BSC with 18.50 (SD = 4.123). This means that primary school teachers with ND qualification complied better than others in the implementation of Science and Mathematics curricula. Furthermore, primary school teachers in the public school had higher mean scores of 23.16 (SD = 2.911) while those in the private had low mean scores of 20.50 (SD = 4.209). This implies that public primary school teachers showed better skills of compliance in the implementation of Science and Mathematics curricula.

3.2. Research Question 2: What is the condition of infrastructure and facilities in the Nigerian primary schools?

Table 2: Analysis of the Condition of Infrastructure and Facilities in Schools

No.	Item	Primary Level, Frequency (Percentage) Responses	
		Yes	No
1	Do you possess Science and Mathematics textbooks of your own?	92 (74.2)	32 (25.8)
2	Do you make use of local materials in learning Science and Mathematics?	94 (75.2)	31 (24.8)
3	Is there science laboratories in your school?	52 (41.9)	72 (58.1)
4	Can you recognize some apparatus in the laboratory?	56 (44.8)	69 (55.2)
5	Can you recognize the use of a ruler as a tool for measuring dimensions to obtain the area of a box?	110 (88.7)	14 (11.3)
6	Can you identify different shapes of objects in the classroom?	108 (86.4)	17 (13.6)
7	Have you got any opportunity to visit places of interest outside the classroom to learn about science?	46 (36.8)	79 (63.2)
8	Is your school located closer to noisy areas?	20 (16.0)	105 (84.0)
9	Is your classroom in a good condition for learning Science and Mathematics?	94 (75.2)	31 (24.8)
10	Do you protect your hands with gloves when working or handling dirty materials?	26 (20.8)	99 (79.2)

As shown in table 2, at primary school level: 74.2% of the pupils possessed Science and Mathematics textbooks of their own while 75.2% others made use of local materials in learning Science and Mathematics. 58.1% of the pupils indicated that their schools were without science laboratories and 55.2% others cannot recognize some apparatus in the laboratory. 88.7% of the pupils indicated that they could recognize the use of a ruler as a tool for measuring dimensions to obtain the area of a box and 86.4% others could identify different shapes of objects in their classrooms. 63.2% of the pupils have not got any opportunity to visit places of interest outside their classroom to learn about science while 84.0% others showed that their schools were located away from noisy areas. 75.2% of primary school pupils appreciated the fact that their classrooms were in a good condition for learning Science and Mathematics and 79.2% others indicated that they did not protect their hands with gloves when working or handling dirty materials. These results show clearly that the basic infrastructure and facilities necessary for laying a sound foundation in science at the primary school level have not been adequately addressed in the course of curriculum implementation as revealed in the areas of laboratory apparatus and use of gloves.

3.3 Research Question 3: What assessment could be obtained in terms of how the present learning environment has or could pave way for Science and Mathematics advancement in Nigeria?

Table 3: Analysis of School Administrators Responses of learning Environment

Factor	Items	Responses Frequency (Percentage)				Decision
		Strongly Agree	Agree	Disagree	Strongly Disagree	
Learning Environment	5. Schools under your jurisdictions have enough classrooms to accommodate all the students	13 (56.5)	5 (21.7)	5 (21.7)	---	Agreed
	6. School environment provides a conducive atmosphere for learning	12 (52.2)	7 (30.7)	3 (13.0)	1 (4.3)	Agreed
	8. Schools have toilet and recreational facilities	4 (17.4)	9 (39.1)	7 (30.4)	3 (13.0)	Agreed

A decision was taken to merge strongly agree and agree with responses as agreed while a disagreed decision was taken for merging disagree and strongly disagree responses. Thus, table 3 indicates that 78.2% of the administrators informed that the schools under their jurisdictions have enough classrooms to accommodate all the students while 82.6% others confirmed that the school environment provided an atmosphere that was conducive for learning. However, 56.5% of the administrators agreed that the schools did not have a toilet and recreational facilities. These results implied that the present state of learning environment in primary schools with respect to the learning Science and Mathematics was been wholesomely inadequate.

3.4 Research Question 4: To what extent does government provides opportunities for capacity building?

Table 4: Analysis of School Administrators Responses to Capacity Building Opportunity

Factor	Items	Responses Frequency (Percentage)				Decision
		Strongly Agree	Agree	Disagree	Strongly Disagree	
Capacity Building	1. There are adequate facilities and finances for proper inspection in the schools	10 (43.5)	9 (39.1)	2 (8.7)	2 (8.7)	Agreed
	3. You are adequately trained in educational supervision for the implementation of the reformed Science and Mathematics curricula	3 (13.0)	13 (56.5)	7 (30.4)	---	Agreed
	9. Your teachers have been properly educated on the purpose and principles of science and mathematics curricula	7 (30.4)	13 (56.5)	2 (8.7)	1 (4.3)	Agreed
	10. The government provides opportunities for Science and Mathematics teachers to attend capacity building workshops, seminars, conferences and professional development courses.	5 (21.7)	4 (17.4)	8 (34.8)	6 (26.1)	Disagreed

From table 4, it is shown that 82.6% of the administrators concurred that there were inadequate facilities and finances for proper inspection in the schools. However, 69.5% of the administrators were of the view that they have been adequately trained in educational supervision for the implementation of the reformed Science and Mathematics curricula. The result shows that 86.9% of teachers have been properly educated on the purpose and principles of Science and Mathematics curricula, however, 60.9% of the administrators disagreed that the government provided opportunities for Science and Mathematics teachers to attend capacity building workshops, seminars, conferences, and professional development courses. This shows that there were inadequate financial support and haphazard inspection of schools as well as non-provision of structured opportunities on the part of the government for Science and Mathematics teachers to develop on the job.

3.5 Research Question 5: To what extent has the administrators shown commitment in ensuring adequate implementation of the Science and Mathematics curricula?

Table 5: Analysis of School Administrators Responses on Commitment to Curricula Implementation

Factor	Items	Responses Frequency (Percentage)				Decision
		Strongly Agree	Agree	Disagree	Strongly Disagree	
Administrator Commitment	2. You personally overview, curriculum effectiveness in Science and Mathematics through regular meetings, with school heads	8 (34.8)	13 (56.5)	1 (4.3)	1 (4.3)	Agreed
	4. You regularly inspect Science and Mathematics teachers' lesson plans/notes, attendance registers and other relevant school records kept by the teachers	12 (52.2)	11 (47.8)	---	---	Agreed
	7. Teachers in your domains had properly furnished staff rooms	1 (4.3)	10 (43.5)	7 (30.4)	5 (21.8)	Disagreed

As contained in table 5, 91.3% of the administrators agreed that they personally overviewed curriculum effectiveness in Science and Mathematics through regular meetings, with departmental heads. Likewise, 100.0% of the administrators agreed that they regularly inspect Science and Mathematics teachers' lesson plans/notes, attendance registers and other relevant school records kept by the teachers. However, 52.2% of the school administrators disagreed that teachers in their domains had properly furnished staff rooms. The results obtained thus far revealed that most school administrators were highly committed to ensuring proper implementation of Science and Mathematics curricula, nonetheless, financial constraints probably hampered their efforts at ensuring composite furnished staff rooms that could boost the morale of teachers to implementing Science and Mathematics curricular curiously.

4. DISCUSSIONS

It was also found that gender, teachers' qualifications, and school type contributed to the level of teachers' compliance with science and mathematics curriculum implementation. The variations could have emanated from the inability of curriculum planners and the government to have exposed the teachers who are the agents of translating the policy document objectives into a pragmatic achievable experience to uniform procedural rudiments. Development of laudable curriculum is of course, germane to manpower development in any nation but proper dissemination of the nitty-

gritty of the contents, in consonance with the national goals and aspiration is all the more a priority. It was found also that basic infrastructure and facilities required for the learning of science and mathematics at the primary school level were not adequately available. By implication, lack of such required facilities would absolutely interfere with and become a barrier to adequate implementation of the curriculum which in its entirety is the learning process.

As part of efforts by researchers to have identified that factor as crucial to standard, Ezeogidi (2014) had found that the standard of infrastructural development was in its pathetic state in Nigeria, although quickly added that Nigerians can nonetheless progress if and only if the system is overhauled. A finding in this study revealed that the primary schools' science and mathematics learning environments were not conducive enough to permit satisfactory implementation of science and mathematics curricula. This finding reflected the outright none provision of toilet and recreational facilities in most schools. No nation would require the services of a horoscope to agree that such learning environment would only be breeding intellectual dullards. This corroborated the submission of Sallis (2002), that if an educational program is to be effectively implemented using policy guidelines in addition to tolerably involving trained and committed teachers, the adequacy and appropriateness of physical facilities such as classrooms, toilets and playgrounds must be accorded some paramount.

The findings in this study equally revealed that there existed an inadequate financial support, haphazard inspection of schools and non-structured opportunities for teachers' development on the job. It is crystal clear that any curriculum innovation would have to be accompanied with ample attention and government sponsorship of workshops where experts in every field of all the disciplines are mobilized to put teachers on the right tract. Our finding in this study showed that school administrators were highly committed to ensuring proper implementation of science and mathematics curricula; however, wellfurnished staff rooms were not available due to financial constraints.

4.1. RECOMMENDATIONS

The findings in this study led to the following suggestions:

- Curriculum planners working for and with the government should expose science and mathematics teachers to uniform procedural rudiments of the curricula in a nationwide workshop.
- Substantial and adequate infrastructure and facilities should be provided by the government to schools on the implementation of science and mathematics curricula and such should be utilized and managed with a positive mindset.
- There should be a pragmatic consideration for comprehensive overhauling of school science and mathematics learning environment for both teachers and learners to be willing to work together for progress.
- A government in its three tiers should ensure the sustainability of capacity building of science and mathematics teachers to entrench dual benefits of aiding the teachers and securing technological advancement for Nigeria.

4.2. CONCLUSIONS

The study has been able to expose some inadequacies with the implementation of science and mathematics curricula in primary schools in the North Central states of Nigeria. Such inadequacies among others relate to: compliance with policy directives, infrastructure and facilities, learning environment, finance, teachers development and administrators' commitment to the proper implementation of the science and mathematics curricula. In view of the

findings, it is advocated that the government would need to study the recommendations raised herein and provide the means for addressing the agitations for the successful implementation of science and mathematics curricula with its battery of benefits.

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REFERENCES

1. Ezeogidi, C. N. O. (2014). *The impact of poor infrastructural development on Nigeria. COOU Interdisciplinary Research Journal 1(1)*
2. Federal Government of Nigeria (2008). *National Policy on Education. Lagos: NERDC Press.*
3. NERDC (2007). *Basic Science and Technology Curriculum. Lagos: NERDC printing press*
4. Sallis, E. (2002). *Total Quality Management in Education.* (3rd Edition). Quick Silver sterling, Virginia. USA: Stylus

APPENDIX

SCHOOLS ADMINISTRATORS QUESTIONNAIRE (SAQ)

This study has been developed to generate data on the implementation of primary and secondary schools, science and mathematics curricula in North-Central Nigeria. I hereby solicit for your cooperation to respond to these questions/statements appropriately. All information provided shall be used for the purpose of this research. Thank you. Please tick (-) or fill in as appropriate.

Section A

Sex: Male (), Female ()

Qualifications: O' level (), NCE (), ND (), HND (), First Degree ()

School Type: Private School (), Public School ()

Section B

SL. NO	ITEMS	SA	A	D	SD
1	There are inadequate facilities and finances for proper inspection in my school				
2	I personally for overview, curriculum effectiveness in science and mathematics and plan future improvements through regular meetings Departmental heads				
3	I have been adequately trained in educational supervision for the new science and mathematics curriculum				
4	I regularly inspect science and mathematics teachers' lesson notes, attendance registers and other relevant school records				
5	The school has enough classrooms to accommodate all the students				
6	The school environment provides an atmosphere conducive to learning				
7	Teachers have properly furnished staff rooms				
8	The school does not have toilet and recreational facilities				
9	Teachers have been properly educated on the purpose and principles of the science and mathematics curriculum				
10	The government has provided opportunities for science and mathematics teachers to attend capacity building workshops/seminars.				

PRIMARY SCHOOL PUPILS' QUESTIONNAIRE (PSPQ)

This questionnaire is meant to seek information on the state of the facilities for learning science and mathematics in your school. Please tick (✓) either 'YES' or 'NO' for the statements in the table:

School

Sex: Female ☐ Male ☐

S/N	ITEM	YES	NO
1	You have a science and mathematics textbooks on your own		
2	You make use of local materials in learning science and mathematics		
3	Your school has a science laboratory		
4	You can recognize some apparatus in the laboratory		
5	A ruler is a tool used before the area of a box can be found		
6	Different shapes of objects are found in your classroom		
7	You have visited some places to learn science outside the classroom		
8	Your school is located close to a noisy place		
9	Your classroom is in a good condition for learning science and mathematics		
10	You always cover your hands with a glove when working with dirty things		

PRIMARY SCHOOLS, TEACHERS QUESTIONNAIRE (PSTQ)

This study has been developed to generate data on the implementation of primary and secondary schools, science and mathematics curricula in North-Central Nigeria. I hereby solicit for your cooperation to respond to these questions/statements appropriately. All information provided shall be used for the purpose of this research. Thank you. Please tick (-) or fill in as appropriate.

Section A

Sex: Male (), Female ()

Qualifications: O' level (), NCE (), ND (), HND (), First Degree ()

School Type: Private School (), Public School ()

Section B

S/N	Items	Response			
		SA	A	D	SD
1	I relate the science and mathematics concepts to the immediate environment when teaching.				
2	The basic science and mathematics curriculum available for my use in the school.				
3	I actively engage my pupils during science and mathematics lesson.				
4	The school inspectors regularly check my lesson plan and other school records.				
5	My school has a functional scientific laboratory.				
6	Classes are well equipped with chairs and tables.				
7	The laboratory/scientific facilities are inadequate for the pupils' population.				
8	I have access to science and mathematics text books/work books in the school library.				
9	I have been sponsored to attend science/mathematics workshop, seminars, and conferences.				
10	Science/mathematics teachers in my school are granted study leave.				